

TUTORIAL 4

1. Determine whether each of the following sentences is a proposition.
 - (a) $2 + 5 = 19$
 - (b) Take out your lecture notes now.
 - (c) $\sqrt{2}$ is an irrational number.
 - (d) How are you?
2. Which of the following propositions is true?
 - (a) Sydney is the capital of Australia.
 - (b) $5 - 3 = 8$
 - (c) 7 is a rational number.
3. Let P mean “Ice floats in water” and Q mean “Australia is in Asia” and R mean “ $1 + 1 = 0$ ”. Write down the following statements in words.
 - (a) $P \wedge R$
 - (b) $Q \vee P$
 - (c) $\sim P$
 - (d) $P \Rightarrow \sim Q$
 - (e) $Q \Leftrightarrow R$
4. If P is true, Q is false and R is false, what is the truth value of the following compound propositions?
 - (a) $P \Rightarrow \sim Q$
 - (b) $\sim R \Rightarrow Q$
 - (c) $P \Leftrightarrow Q$
 - (d) $Q \Leftrightarrow R$
5. If P and Q are propositions, the proposition in the form “if P then Q ” is called a conditional proposition. Restate the following propositions in the form above.
 - (a) All the students will pass the examination if they study hard.
 - (b) A sufficient condition for Patty to take Computing Theory is that she passes Mathematics for Computing.
 - (c) The text is legible only if it is typewritten.
6. Let P mean “The programme is readable” and Q mean “The programme is well-structured”.
 - (a) What is the converse of $P \Rightarrow Q$?
 - (b) What is the contrapositive of $P \Rightarrow Q$?
7. Determine the *contrapositive* of the following statements:
 - (a) If Anthony is a novelist, then he is creative.
 - (b) Only if Amy studies will she pass the test.

8. Which of the following statements are true?
- (a) Some newspapers in Malaysia have daily editions.
 - (b) All computer scientists like to watch movies.
 - (c) None of the college students in Asia like durians.